CENTERS FOR DISEASE CONTROL

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## *Epidemiologic Notes and Reports*

# Hepatitis B Associated with Jet Gun Injection — California

In March 1985, during routine investigation of hepatitis B (HB) case reports, an epidemiologist at the Long Beach (California) Department of Public Health noted that three HB patients had each received injections at the same weight-reduction clinic (clinic A) before disease onset. When review of previous case records and questioning of newly reported HB patients identified five additional HB cases among clinic attendees, the California Department of Health Services joined in the investigation of the clinic on July 1, 1985.

Clinic A belonged to a chain of 29 weight-reduction clinics located throughout southern California. Attendees at the clinics typically received a series of daily parenteral injections of human chorionic gonadotropin (HCG). Injections were usually given by jet injectors (Med-E-Jet Corp, Cleveland, Ohio), although some attendees received injections with single-use disposable needles and syringes. A standard regimen consisted of 30 injections; however, individuals varied considerably in duration of treatment and number of injections received.

The investigation focused on a cohort of 341 persons who attended clinic A during the first 6 months of 1985. Clinical history, review of risk factors for acquiring hepatitis B virus (HBV) infection, serologic testing for HBV markers (hepatitis B surface antigen [HBsAg], antibody to HB core antigen [anti-HBc], and IgM anti-HBc) and quantification of parenteral exposures at the clinic were obtained on 287 (84%) of cohort members. For comparison, 93 new attendees (after July 1, 1985) at clinic A and random samples of 100 prior attendees and 70 new attendees at the other Long Beach clinic (clinic B) were tested for markers of HBV infection.

Ultimately, 31 cases of clinical HB were identified among attendees of Clinic A (Figure 1). Onset dates ranged from January 1984 to November 1985, with the majority of cases occurring between February and November 1985. Only two (6%) of the patients with clinical HB had other identified risk factors for acquiring HBV infection in the 6 months before their illnesses.

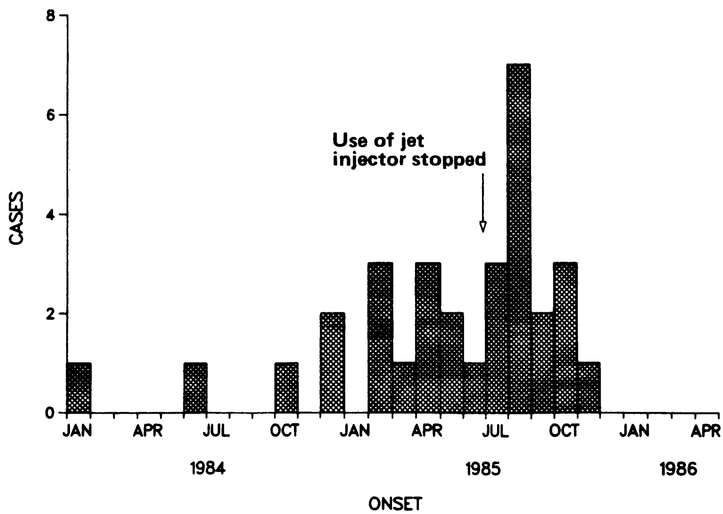
The serologic study demonstrated that 21% of the cohort that attended clinic A between January 1, and July 1, 1985, had evidence of recent HBV infection, including 27 clinical and 33 subclinical (IgM anti-HBc positive) cases. In contrast, none of the 93 new attendees of clinic A had evidence of recent HBV infection ($p < 0.01$). When all serologic markers of HBV infection were examined, 43% of the cohort that attended clinic A between January 1 and July 1 had evidence of HBV infection, compared with 7% of new attendees at clinic A; 8% of persons who attended clinic B on or before July 1; and 6% of persons who began attending clinic B after July 1.

*Hepatitis B — Continued*

On initial analysis of the cohort members, exposure to the jet injectors and HCG were both significantly associated with the development of acute HBV infection. However, two lots of HCG used at the clinic during the outbreak (from February 1985 onward) were negative when tested for HBsAg. Furthermore, stratification of cohort members who received HCG by type of parenteral inoculation (jet injector only, compared with syringe only) showed that 24% of those receiving injections by jet injector had developed acute HBV infection compared with none of those receiving injections by syringe only ($p < 0.01$) (Table 1). These two groups had similar numbers of HCG exposures, with the syringe-only group averaging 31, while the jet injector-only group averaged 27.

Some patients at clinic A reported that they had sustained lacerations and bruising in the course of receiving the jet injections. Written protocols at clinic A specified that the Med-E-Jet injector nozzle be wiped with 70% isopropyl alcohol between injections, and that at the end of each day, the nozzle retaining cap and the tip be removed and disinfected. As an adjunct to this investigation, CDC conducted a series of *in vitro* and *in vivo* laboratory experiments to assess the potential for a contaminated Med-E-Jet to transmit HBV from patient to patient and to assess the potential for HBsAg contamination of this jet injector during actual use. After contaminating the nozzle tip of the jet injector with a known quantity (0.025 ml) of HBsAg-containing serum, the injector was fired into separate 1-dram vials (to simulate downstream transmission) and swab samples were taken of the exterior and interior surfaces of the nozzle. This procedure was repeated 10 times. A second set of experiments was conducted using the same procedure but with acetone swabbing to provide mechanical cleaning of the tip before discharge into the vials. In the first set of experiments (no acetone swabbing), HBsAg was found in 80% of the injection fluid vials and 87% of the swabs from the exterior and interior nozzle surfaces. Swabbing the contaminated tip of the Med-E-Jet with a cotton ball moistened in acetone did not significantly reduce the frequency with which HBsAg was found in any of these sites. However, the Med-E-Jet did not become contaminated during actual use when five injections were done on an HBsAg-positive chimpanzee. Bleeding did

**FIGURE 1. Cases of acute clinical hepatitis B in a weight-reduction clinic, by month of onset — California, 1984-1985**



*Hepatitis B — Continued*

occur at the injection sites, even though injections were carefully done according to manufacturers recommendations.

The jet injectors were removed from use at clinic A on July 2. No cases have been identified among persons treated at clinic A after this date, and no cases associated with any of the other clinics in the chain have been identified to date. Both the manufacturer and the U.S. Food and Drug Administration have been informed of these findings.

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**Editorial Note:** This is the first reported outbreak of any disease in which any kind of jet injector has been implicated as the vehicle of transmission. The CDC experiments reported here suggest that the Med-E-Jet, if contaminated, could transmit HBV but that it does not become contaminated easily during actual use. Once contaminated, however, the Med-E-Jet could not be easily cleaned by a simple swabbing technique, probably because of inaccessibility of contaminated surfaces of the nozzle tip and under the nozzle retaining cap. Furthermore, wiping the nozzle tip with a swab soaked in alcohol or acetone would not be expected to inactivate HBV. To ensure proper decontamination, disassembly and sterilization of the nozzle tip would be necessary.

Other investigators have attempted to assess the risk of HBV transmission by applying jet injections, using another model of jet injector, to two human chronic hepatitis B carriers and evaluating injection sites and the injection nozzle for contamination with HBsAg (*1*). All swab samples from injection sites and the exterior surface of the nozzle were negative for HBsAg. One other study, however, demonstrated transmission of the lactic dehydrogenase (LDH) virus between mice by subcutaneous jet injection with a Med-E-Jet (*2*). In the CDC studies, the estimated volume of contaminating material transferred in downstream injections was 0.53 $\mu l$ ($0.53 \times 10^{-3}$ml). Therefore, it can be estimated that viruses that circulate in high titers in blood, such as HBV ($10^8$/ml) and LDH virus ($10^7$/ml), could be transferred during a procedure if gun contamination occurred. The probability of transferring microorganisms present in lower concentration ($< 10^3$/ml) would be correspondingly lower.

The extensive transmission of HBV infection in this outbreak appears to have resulted from the unusual circumstance of multiple repeated jet gun injections in a cohort of patients. The initial likelihood of a highly infectious (HBeAg-positive) HBV carrier attending the clinic was low, but after initial disease transmission from such a carrier, patients incubating disease could serve as sources of infection for others, amplifying infection risk through several cycles and ultimately leading to high attack rates in the study cohort. Nevertheless, the magnitude of

**TABLE 1. Hepatitis B virus infections in HCG recipients by method of parenteral inoculation — California, 1985**

| | No. (%) positive for HBV infection | | |
|---|---|---|---|
| HBV classification | Jet injector only (N = 239) | Syringe only (N = 22) | Significance* |
| Acute clinical | 24 (10) | 0 (0) | $p = 0.11$ |
| Total acute infections | 57 (24) | 0 (0) | $p < 0.01$ |
| Total (any serologic marker) | 112 (47) | 1 (4) | $p < 0.01$ |

*Jet injector vs. syringe, Fisher's exact test.

*Hepatitis B — Continued*

this outbreak can be explained only if the jet injector became contaminated repeatedly during use at the clinic.

Before this outbreak, virtually all epidemiologic observations have indicated that the jet-injector method of administering parenteral fluids, when properly done, is safe and effective. The current data suggest that, if this type of jet injector (Med-E-Jet) becomes contaminated with blood, disease transmission can occur and indicate a need for further assessments of the possibilities of disease transmission by other types of jet guns. Proper design of jet injectors to minimize risk of blood contamination of the nozzle tips, training in use of guns, and care in cleaning and disinfection if blood contamination occurs is necessary to ensure the continued safe use of these instruments.

*References*

1. Abb J, Deinhardt F, Eisenburg J. The risk of transmission of hepatitis B virus using jet injection in inoculation. J Infect Dis 1981;144:179.
2. Brink PRG, van Loon AM, Trommelen JCM, Gribnau FWJ, Smale-Novakova IRO. Virus transmission by subcutaneous jet injection. J Med Microbiol 1985;20:393-7.

*Current Trends*

## Recommendations for Providing Dialysis Treatment to Patients Infected with Human T-Lymphotropic Virus Type III/Lymphadenopathy-Associated Virus

Patients with end-stage renal disease who are undergoing maintenance dialysis and who have manifestations of human T-lymphotropic virus type III/lymphadenopathy-associated virus (HTLV-III/LAV)* infection, including acquired immunodeficiency syndrome (AIDS), or who are positive for antibody to HTLV-III/LAV can be dialyzed in hospital-based or free-standing dialysis units using conventional infection-control precautions. Standard blood and body fluid precautions and disinfection and sterilization strategies routinely practiced in dialysis centers are adequate to prevent transmission of HTLV-III/LAV.

Soon after AIDS was recognized in the United States, it became apparent that risk factors for persons with AIDS were similar to risk factors for persons with hepatitis B virus (HBV) infection (*1*). Prevention measures applied to control HBV infection in health-care institutions were used as a model to develop infection-control guidelines for patients with AIDS before the identification of the etiologic agent and the development of serologic tests for antibody to HTLV-III/LAV (anti-HTLV-III). Isolation of infected patients and nonreuse of a dialyzer by the same patient were initially recommended for patients receiving dialysis in dialysis centers (*2*). These strategies are not currently believed necessary for preventing HTLV-III/LAV transmission.

No transmission of HTLV-III/LAV infection in the dialysis-center environment has been reported (*3*), and the possibility of such transmission appears extremely unlikely when routine infection-control precautions are followed (*4*). The routine infection-control precautions used in all dialysis centers when dialyzing all patients are considered adequate to prevent HTLV-III/LAV transmission. These would include: blood precautions; routine cleaning and disinfection

*An international committee on taxonomy has proposed the name human immunodeficiency virus (HIV).

*HTLV-III/LAV — Continued*

of dialysis equipment and surfaces that are frequently touched; and restriction of nondisposable supplies to individual patients unless such supplies are sterilized between uses (*2*).

The following recommendations take into consideration recent knowledge about HTLV-III/LAV and update infection-control strategies for dialyzing patients infected with HTLV-III/LAV:

1. Procedures for environmental control and for disinfection and sterilization of hemodialysis machines have been described (*5*). The hemodialysis machine pumps dialysis fluid into the dialyzer (artificial kidney) where circulating blood from the patient is separated from the dialysis fluid by a membrane. The dialyzer, along with the associated blood lines, is disposable. Strategies for disinfecting the dialysis fluid pathways of the hemodialysis machine are targeted to control bacterial contamination and generally consist of using about 500-750 ppm of sodium hypochlorite for 30-40 minutes or 1.5%-2.0% formaldehyde overnight. In addition, several chemical germicides formulated to disinfect dialysis machines are commercially available. None of these protocols or procedures need to be altered after dialyzing patients infected with HTLV-III/LAV. Chemical germicides used for disinfection and sterilization of devices in the dialysis center are effective against HTLV-III/LAV (*4*).
2. Patients infected with HTLV-III/LAV can be dialyzed by either hemodialysis or peritoneal dialysis and do not need to be isolated from other patients. The type of dialysis treatment (i.e., hemodialysis or peritoneal dialysis) should be based on the needs of the patient. The dialyzer may be discarded after each use. Alternatively, centers that have dialyzer-reuse programs, in which a specific dialyzer is issued to a specific patient, removed, cleaned, disinfected, and reused several times on the same patient only, may include HTLV-III/LAV-infected patients in the dialyzer-reuse program. An individual dialyzer must never be used on more than one patient.
3. Standard infection-control strategies that are used routinely in dialysis units for all dialysis patients and personnel should be used to prevent HTLV-III/LAV transmission. Specifically, these strategies include blood precautions and barrier techniques, such as the use of gloves, gowns, and handwashing techniques, that have been described elsewhere (*4-8*).
4. Precautions against needlestick injuries, as well as the appropriate use of barrier precautions, such as wearing gloves when handling items contaminated with blood or serum, should be practiced by all personnel caring for all dialysis patients. Such injuries constitute the major potential risk for HTLV-III/LAV transmission to personnel. Extraordinary care should be taken to prevent injuries to hands caused by needles, scalpels, and other sharp instruments or devices during procedures; when cleaning used instruments; during disposal of used needles; and when handling sharp instruments following procedures. After use, disposable syringes and needles, scalpel blades, and other sharp items must be placed in puncture-resistant containers for disposal. To prevent needlestick injuries, needles should not be recapped; purposefully bent or broken; removed from disposable syringes; or otherwise manipulated by hand. No data are currently available from controlled studies examining the effect, if any, of the use of needle-cutting devices on the incidence of needlestick injuries.

*Reported by Hospital Infections Program, AIDS Program, Center for Infectious Diseases, CDC.*

**Editorial Note:** In a study of 520 dialysis patients, 25 were reactive for anti-HTLV-III/LAV by enzyme immunoassay (EIA), but only four were confirmed by the Western blot technique (*3*). The rate of falsely reactive EIA tests among these dialysis patients was 4%, much higher than the falsely reactive rate for blood donors (0.17%). The rate of truly reactive tests was 0.8%, *HTLV-III/LAV – Continued*

much lower than in high-risk groups but higher than in blood donors. The higher rate of falsely reactive tests is probably due to the exposure of dialysis patients to H9-cell-associated antigens during blood transfusions that are common among these patients. These antigens are also present in cell lines used to grow HTLV-III/LAV for use as reagents in serologic tests for anti-HTLV-III/LAV (*9*). Identification of antibody to H9 lymphoid cell lines in the absence of isolation of HTLV-III/LAV in dialysis patients with reactive EIA and nonreactive Western blot tests supports the conclusion that these test results are falsely reactive. The higher rate of truly reactive tests most likely reflects the frequency of blood transfusion in this patient population before initiation of blood donor screening for anti-HTLV-III/LAV. None of the four infected persons identified in that study were dialyzed in the same dialysis center.

CDC is initiating a cooperative study to further assess the prevalence of anti-HTLV-III/LAV among patients undergoing chronic hemodialysis. Representatives of dialysis centers who are interested in participating in such a study and who regularly have more than 60 patients on dialysis should contact the Hospital Infections Program, Center for Infectious Diseases, CDC, Building 1, Room 5065, Atlanta, Georgia 30333 (telephone [404] 329-3406).

*(Continued on page 383)*

**TABLE I. Summary—cases specified notifiable diseases, United States**

| Disease | 23rd Week Ending | | | Cumulative, 23rd Week Ending | | |
|---|---|---|---|---|---|---|
| | June 7, 1986 | June 8, 1985 | Median 1981-1985 | June 7, 1986 | June 8, 1985 | Median 1981-1985 |
| Acquired Immunodeficiency Syndrome (AIDS) | 141 | 155 | N | 5,428 | 3,086 | N |
| Aseptic meningitis | 94 | 124 | 131 | 1,937 | 1,699 | 1,803 |
| Encephalitis: Primary (arthropod-borne & unspec.) | 8 | 21 | 21 | 323 | 402 | 399 |
| Post-infectious | 7 | 2 | 2 | 48 | 61 | 49 |
| Gonorrhea: Civilian | 15,101 | 17,140 | 17,140 | 356,295 | 347,132 | 387,280 |
| Military | 193 | 230 | 472 | 6,833 | 8,279 | 10,644 |
| Hepatitis: Type A | 339 | 470 | 389 | 9,518 | 9,381 | 9,709 |
| Type B | 396 | 504 | 467 | 11,004 | 10,917 | 10,208 |
| Non A, Non B | 66 | 55 | N | 1,502 | 1,804 | N |
| Unspecified | 66 | 129 | 163 | 2,135 | 2,407 | 3,219 |
| Legionellosis | 11 | 20 | N | 234 | 282 | N |
| Leprosy | 7 | 2 | 2 | 122 | 162 | 105 |
| Malaria | 31 | 15 | 15 | 341 | 329 | 330 |
| Measles: Total* | 374 | 53 | 66 | 3,330 | 1,384 | 1,384 |
| Indigenous | 353 | 51 | N | 3,154 | 1,133 | N |
| Imported | 21 | 2 | N | 176 | 251 | N |
| Meningococcal infections: Total | 29 | 36 | 62 | 1,355 | 1,296 | 1,531 |
| Civilian | 29 | 36 | 61 | 1,353 | 1,291 | 1,528 |
| Military | - | - | - | 2 | 5 | 7 |
| Mumps | 47 | 64 | 108 | 1,811 | 1,765 | 1,948 |
| Pertussis | 77 | 55 | 25 | 1,120 | 714 | 714 |
| Rubella (German measles) | 10 | 12 | 52 | 242 | 252 | 607 |
| Syphilis (Primary & Secondary): Civilian | 413 | 468 | 525 | 11,036 | 10,900 | 13,214 |
| Military | 3 | 4 | 4 | 82 | 83 | 166 |
| Toxic Shock syndrome | 1 | 5 | N | 154 | 174 | N |
| Tuberculosis | 444 | 393 | 536 | 8,980 | 8,730 | 9,810 |
| Tularemia | 1 | 9 | 11 | 30 | 63 | 74 |
| Typhoid fever | 3 | 4 | 5 | 107 | 130 | 144 |
| Typhus fever, tick-borne (RMSF) | 33 | 32 | 40 | 144 | 159 | 179 |
| Rabies, animal | 82 | 102 | 122 | 2,382 | 2,250 | 2,723 |

**TABLE II. Notifiable diseases of low frequency, United States**

| | Cum 1986 | | Cum 1986 |
|---|---|---|---|
| Anthrax | - | Leptospirosis | 17 |
| Botulism: Foodborne | 4 | Plague | - |
| Infant | 22 | Poliomyelitis, Paralytic | - |
| Other | - | Psittacosis | 30 |
| Brucellosis (N.Y. City, Nebr. 1, Calif. 1) | 30 | Rabies, human | - |
| Cholera | - | Tetanus | 17 |
| Congenital rubella syndrome | 2 | Trichinosis | 9 |
| Congenital syphilis, ages < 1 year | 11 | Typhus fever, flea-borne (endemic, murine) | 10 |
| Diphtheria | - | | |

*Three of the 374 reported cases for this week were imported from a foreign country or can be directly traceable to a known internationally imported case within two generations.

**TABLE III. Cases of specified notifiable diseases, United States, weeks ending June 7, 1986 and June 8, 1985 (23rd Week)**

| Reporting Area | AIDS | Aseptic Menin-gitis | Encephalitis | | Gonorrhea (Civilian) | | Hepatitis (Viral), by type | | | | Legionel-losis | Leprosy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Primary | Post-in-fectious | | | A | B | NA,NB | Unspeci-fied | | |
| | Cum. 1986 | 1986 | Cum. 1986 | Cum. 1986 | Cum. 1986 | Cum. 1985 | 1986 | 1986 | 1986 | 1986 | 1986 | Cum. 1986 |
| UNITED STATES | 5,428 | 94 | 323 | 48 | 356,295 | 347,132 | 339 | 396 | 66 | 66 | 11 | 122 |
| NEW ENGLAND | 216 | 3 | 9 | 2 | 8,184 | 10,440 | 6 | 37 | 5 | 5 | - | 5 |
| Maine | 11 | - | - | - | 417 | 426 | 1 | 3 | 2 | - | - | - |
| N.H. | 6 | - | 2 | - | 212 | 214 | - | - | - | - | - | - |
| Vt. | 2 | 1 | 2 | 1 | 113 | 123 | 1 | 2 | 1 | - | - | - |
| Mass. | 112 | 1 | 2 | - | 3,541 | 3,905 | 3 | 21 | 1 | 4 | - | 5 |
| R.I. | 13 | 1 | - | - | 764 | 802 | - | 4 | 1 | - | - | - |
| Conn. | 72 | - | 3 | 1 | 3,137 | 4,970 | 1 | 7 | - | 1 | - | - |
| MID ATLANTIC | 2,126 | 8 | 50 | 4 | 59,914 | 50,563 | 19 | 28 | 5 | 10 | - | 11 |
| Upstate N.Y. | 200 | 6 | 19 | 3 | 6,929 | 6,879 | 14 | 9 | 3 | - | - | 1 |
| N.Y. City | 1,437 | 1 | 11 | - | 34,703 | 23,912 | 2 | 2 | - | 10 | - | 9 |
| N.J. | 334 | 1 | 6 | - | 7,915 | 9,005 | 3 | 17 | 2 | - | - | - |
| Pa. | 155 | - | 14 | 1 | 10,367 | 10,767 | - | - | - | - | - | 1 |
| E.N. CENTRAL | 337 | 6 | 73 | 7 | 46,987 | 48,740 | 7 | 33 | 3 | 3 | 3 | 4 |
| Ohio | 65 | 2 | 20 | 2 | 11,256 | 12,264 | 1 | 12 | 1 | 1 | 3 | - |
| Ind. | 29 | 2 | 9 | 2 | 5,480 | 4,874 | 1 | 4 | 1 | 1 | - | - |
| Ill. | 170 | - | 18 | 2 | 13,025 | 13,564 | - | - | - | - | - | 3 |
| Mich. | 56 | 2 | 24 | 1 | 15,024 | 13,839 | 5 | 17 | 1 | 1 | - | 1 |
| Wis. | 17 | - | 2 | - | 2,202 | 4,199 | - | - | - | - | - | - |
| W.N. CENTRAL | 94 | 1 | 10 | 7 | 15,652 | 17,374 | 8 | 14 | 4 | - | 2 | 2 |
| Minn. | 42 | - | 6 | - | 2,263 | 2,570 | 1 | 1 | 1 | - | - | 1 |
| Iowa | 7 | 1 | 4 | - | 1,623 | 1,820 | 2 | - | 1 | - | - | - |
| Mo. | 25 | - | - | - | 8,025 | 8,221 | 3 | 3 | - | - | - | - |
| N. Dak. | 2 | - | - | - | 135 | 128 | - | - | - | - | - | - |
| S. Dak. | 1 | - | - | - | 332 | 315 | 2 | - | 2 | - | - | - |
| Nebr. | 5 | - | - | - | 1,129 | 1,531 | - | 4 | - | - | - | - |
| Kans. | 12 | - | - | 7 | 2,145 | 2,789 | - | 6 | - | - | 2 | 1 |
| S. ATLANTIC | 719 | 18 | 46 | 15 | 86,972 | 75,414 | 73 | 99 | 16 | 4 | 6 | 1 |
| Del. | 12 | - | 3 | - | 1,484 | 1,691 | - | 1 | - | - | - | - |
| Md. | 78 | 2 | 12 | - | 10,731 | 11,966 | 5 | 13 | 1 | - | 4 | - |
| D.C. | 103 | - | - | - | 7,157 | 6,197 | - | - | 1 | - | - | - |
| Va. | 75 | 1 | 16 | 1 | 7,753 | 7,781 | - | 4 | - | - | - | 1 |
| W. Va. | 2 | - | 6 | - | 1,034 | 1,067 | 1 | 1 | - | 1 | - | - |
| N.C. | 32 | 3 | 8 | 1 | 15,115 | 14,448 | 1 | 12 | 4 | - | 1 | - |
| S.C. | 18 | 3 | - | - | 8,362 | 9,308 | 1 | 34 | 5 | 2 | 1 | - |
| Ga. | 87 | 3 | - | - | 9,359 | - | 1 | 9 | - | - | - | - |
| Fla. | 312 | 6 | 1 | 13 | 25,977 | 22,956 | 64 | 25 | 5 | 1 | - | - |
| E.S. CENTRAL | 69 | 7 | 21 | 2 | 30,259 | 30,068 | 6 | 24 | 3 | - | - | 1 |
| Ky. | 14 | 3 | 9 | 1 | 3,453 | 3,313 | 4 | 3 | - | - | - | - |
| Tenn. | 36 | - | 2 | 1 | 11,803 | 11,867 | 1 | 9 | 1 | - | - | - |
| Ala. | 12 | 4 | 9 | - | 8,547 | 9,794 | 1 | 12 | 2 | - | - | 1 |
| Miss. | 7 | - | 1 | - | 6,456 | 5,094 | - | - | - | - | - | - |
| W.S. CENTRAL | 368 | 18 | 33 | 3 | 45,402 | 47,491 | 25 | 31 | 8 | 10 | - | 7 |
| Ark. | 15 | - | - | - | 4,195 | 4,429 | 2 | 6 | 1 | - | - | - |
| La. | 66 | 4 | 2 | - | 8,140 | 9,774 | 1 | 3 | - | - | - | - |
| Okla. | 17 | - | 8 | - | 5,260 | 4,953 | 7 | 3 | 3 | - | - | - |
| Tex. | 270 | 14 | 23 | 3 | 27,807 | 28,335 | 15 | 19 | 4 | 10 | - | 7 |
| MOUNTAIN | 150 | 10 | 15 | 1 | 11,095 | 11,294 | 40 | 26 | 3 | 5 | - | 8 |
| Mont. | 3 | - | - | 1 | 304 | 315 | - | - | - | - | - | - |
| Idaho | 1 | - | - | - | 365 | 377 | 3 | - | - | - | - | - |
| Wyo. | 4 | 8 | 2 | - | 261 | 280 | - | - | - | 1 | - | - |
| Colo. | 81 | - | 2 | - | 2,884 | 3,458 | 8 | 5 | - | - | - | 3 |
| N. Mex. | 6 | - | 1 | - | 1,120 | 1,317 | 16 | - | - | - | - | - |
| Ariz. | 36 | - | 7 | - | 3,609 | 3,271 | 6 | 14 | - | 1 | - | 3 |
| Utah | 8 | 1 | 2 | - | 475 | 482 | 1 | 3 | 1 | 1 | - | - |
| Nev. | 11 | 1 | 1 | - | 2,077 | 1,794 | 6 | 4 | 2 | 2 | - | 2 |
| PACIFIC | 1,349 | 23 | 66 | 7 | 51,830 | 55,748 | 155 | 104 | 19 | 29 | - | 83 |
| Wash. | 49 | 1 | 6 | - | 3,917 | 3,890 | 39 | 22 | 2 | 5 | - | 10 |
| Oreg. | 29 | - | - | - | 2,095 | 2,767 | 20 | 14 | 3 | - | - | - |
| Calif. | 1,248 | 19 | 58 | 7 | 43,884 | 46,968 | 92 | 64 | 14 | 24 | - | 60 |
| Alaska | 9 | 1 | 2 | - | 1,309 | 1,307 | 4 | 2 | - | - | - | - |
| Hawaii | 14 | 2 | - | - | 625 | 816 | - | 2 | - | - | - | 13 |
| Guam | - | - | - | - | 54 | 83 | - | - | - | - | - | 1 |
| P.R. | 57 | 1 | 3 | - | 969 | 1,612 | 1 | 5 | - | - | - | 7 |
| V.I. | 2 | U | - | - | 93 | 213 | U | U | U | U | U | - |
| Pac. Trust Terr. | - | - | - | - | 133 | 421 | 5 | - | - | 4 | - | 18 |
| Amer. Samoa | - | - | - | - | 19 | - | - | - | - | - | - | 1 |

N: Not notifiable U: Unavailable

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending June 7, 1986 and June 8, 1985 (23rd Week)

| Reporting Area | Malaria | Measles (Rubeola) | | | | | Meningococcal Infections | Mumps | | Pertussis | | | Rubella | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Indigenous | | Imported * | | Total | | | | | | | | | |
| | Cum. 1986 | 1986 | Cum. 1986 | 1986 | Cum. 1986 | Cum. 1985 | Cum. 1986 | 1986 | Cum. 1986 | 1986 | Cum. 1986 | Cum. 1985 | 1986 | Cum. 1986 | Cum. 1985 |
| UNITED STATES | 341 | 353 | 3,154 | 21 | 176 | 1,384 | 1,355 | 47 | 1,811 | 77 | 1,120 | 714 | 10 | 242 | 252 |
| NEW ENGLAND | 21 | 1 | 24 | - | 4 | 101 | 102 | 3 | 40 | 1 | 58 | 34 | - | 4 | 9 |
| Maine | 1 | - | - | - | - | - | 21 | - | - | - | 2 | 3 | - | - | - |
| N.H. | 1 | - | - | - | - | - | 5 | - | 10 | 1 | 21 | 17 | - | 1 | 2 |
| Vt. | 1 | - | - | - | - | - | 15 | - | 1 | - | 3 | 2 | - | - | - |
| Mass. | 11 | 1 | 21 | - | 3 | 96 | 20 | 2 | 3 | - | 16 | 5 | - | - | 6 |
| R.I. | 2 | - | 2 | - | - | - | 14 | 1 | 7 | - | 1 | 4 | - | 2 | - |
| Conn. | 5 | - | 1 | - | 1 | 5 | 27 | - | 19 | - | 15 | 3 | - | 1 | 1 |
| MID ATLANTIC | 34 | 46 | 1,116 | - | 18 | 132 | 211 | 6 | 100 | 2 | 100 | 68 | - | 27 | 69 |
| Upstate N.Y. | 8 | 9 | 24 | - | 17 | 63 | 68 | 1 | 35 | 1 | 67 | 35 | - | 19 | 9 |
| N.Y. City | 11 | 20 | 238 | - | 1 | 35 | 44 | - | 5 | - | 3 | 9 | - | 5 | 40 |
| N.J. | 3 | 14 | 835 | - | - | 11 | 27 | 5 | 29 | - | 7 | 2 | - | 3 | 8 |
| Pa. | 12 | 3 | 19 | - | - | 23 | 72 | - | 31 | 1 | 23 | 22 | - | - | 12 |
| E.N. CENTRAL | 12 | 37 | 465 | - | 12 | 370 | 181 | 13 | 1,003 | - | 164 | 98 | 1 | 12 | 20 |
| Ohio | 3 | - | - | - | 8 | 43 | 76 | - | 85 | - | 68 | 14 | - | - | - |
| Ind. | - | - | - | - | - | 1 | 17 | 2 | 21 | - | 19 | 11 | - | - | - |
| Ill. | 4 | 31 | 295 | - | 1 | 221 | 43 | 3 | 610 | - | 19 | 18 | 1 | 8 | 5 |
| Mich. | 5 | 6 | 14 | - | - | 51 | 43 | 7 | 155 | - | 20 | 13 | - | 3 | 14 |
| Wis. | - | - | 156 | - | 3 | 54 | 2 | 1 | 132 | - | 38 | 42 | - | 1 | 1 |
| W.N. CENTRAL | 9 | 2 | 153 | - | 16 | 9 | 72 | 1 | 65 | 2 | 62 | 61 | - | 7 | 16 |
| Minn. | 3 | - | 27 | - | 4 | 4 | 15 | - | 1 | - | 28 | 13 | - | - | 2 |
| Iowa | 1 | - | 17 | - | 1 | - | 9 | - | 13 | - | 9 | 3 | - | - | - |
| Mo. | 3 | - | 7 | - | 6 | 2 | 24 | - | 12 | 1 | 5 | 13 | - | 1 | 5 |
| N. Dak. | - | - | 10 | - | 1 | 2 | - | - | 2 | - | 2 | 6 | - | - | 2 |
| S. Dak. | - | - | - | - | - | - | 4 | - | 1 | - | 7 | 1 | - | - | - |
| Nebr. | 1 | - | - | - | - | - | 8 | - | - | - | - | 3 | - | - | - |
| Kans. | 1 | 2 | 92 | - | 4 | 1 | 12 | 1 | 36 | 1 | 11 | 22 | - | 6 | 7 |
| S. ATLANTIC | 44 | 48 | 378 | 17 | 50 | 170 | 268 | 11 | 116 | 5 | 410 | 163 | - | 8 | 28 |
| Del. | - | - | 1 | - | - | - | 1 | - | - | 1 | 213 | - | - | - | 1 |
| Md. | 7 | - | 19 | - | 8 | 27 | 35 | 3 | 9 | 2 | 64 | 70 | - | - | 1 |
| D.C. | - | - | - | - | - | 2 | 4 | - | - | - | - | - | - | - | - |
| Va. | 8 | 5 | 19 | 4 § | 24 | 19 | 50 | 2 | 20 | - | 15 | 3 | - | - | 1 |
| W. Va. | 2 | - | 2 | - | - | 31 | 3 | 1 | 32 | - | 5 | - | - | - | 9 |
| N.C. | 4 | - | 1 | - | 1 | 3 | 44 | 1 | 11 | - | 19 | 8 | - | - | - |
| S.C. | 3 | - | 274 | - | - | - | 24 | - | 11 | - | 5 | - | - | - | 2 |
| Ga. | 4 | 43 | 50 | 13 § | 14 | 8 | 40 | 2 | 12 | 2 | 72 | 51 | - | - | - |
| Fla. | 16 | - | 12 | - | 3 | 80 | 67 | 2 | 21 | - | 17 | 31 | - | 8 | 14 |
| E.S. CENTRAL | 7 | - | 3 | - | - | 1 | 77 | 1 | 18 | 1 | 20 | 6 | - | 1 | 1 |
| Ky. | 2 | - | - | - | - | - | 15 | - | 3 | - | 1 | 1 | - | 1 | 1 |
| Tenn. | - | - | 1 | - | - | - | 31 | - | 12 | - | 5 | 1 | - | - | - |
| Ala. | 3 | - | - | - | - | - | 22 | 1 | 2 | 1 | 14 | 2 | - | - | - |
| Miss. | 2 | - | 2 | - | - | 1 | 9 | - | 1 | - | - | 2 | - | - | - |
| W.S. CENTRAL | 28 | 137 | 490 | 1 | 29 | 96 | 110 | 6 | 124 | 56 | 86 | 95 | - | 48 | 20 |
| Ark. | - | - | 276 | - | 2 | - | 15 | - | 7 | 1 | 3 | 11 | - | - | 1 |
| La. | 4 | 1 | 1 | - | - | 10 | 15 | 1 | 2 | - | 4 | 5 | - | - | - |
| Okla. | 3 | 1 | 8 | - | 4 | - | 15 | N | N | 27 | 51 | 66 | - | - | 1 |
| Tex. | 21 | 135 | 205 | 1 † | 23 | 86 | 65 | 5 | 115 | 28 | 28 | 13 | - | 48 | 18 |
| MOUNTAIN | 11 | 28 | 232 | 2 | 21 | 389 | 68 | 2 | 178 | 6 | 110 | 34 | 3 | 8 | 4 |
| Mont. | - | - | - | - | 7 | 137 | 7 | - | 5 | - | 6 | 3 | - | - | - |
| Idaho | 1 | 1 | 1 | - | - | 89 | 1 | 1 | 3 | - | 26 | - | - | - | 1 |
| Wyo. | - | - | - | - | - | - | 2 | - | - | - | 1 | - | - | - | - |
| Colo. | 2 | - | 2 | - | 4 | 6 | 10 | 1 | 9 | 5 | 32 | 10 | - | - | - |
| N. Mex. | - | - | 21 | - | 5 | 3 | 6 | N | N | - | 9 | 4 | - | - | 2 |
| Ariz. | 5 | 27 | 208 | 2 † | 5 | 154 | 14 | - | 149 | - | 24 | 9 | - | 1 | 1 |
| Utah | 2 | - | - | - | - | - | 7 | - | 9 | 1 | 12 | 8 | 3 | 4 | - |
| Nev. | 1 | - | - | - | - | - | 21 | - | 3 | - | - | - | - | 3 | - |
| PACIFIC | 175 | 54 | 293 | 1 | 26 | 116 | 266 | 4 | 167 | 4 | 110 | 155 | 6 | 127 | 85 |
| Wash. | 14 | 7 | 60 | - | 11 | 1 | 35 | - | 7 | 1 | 42 | 24 | 2 | 5 | 2 |
| Oreg. | 12 | - | - | 1 § | 4 | 3 | 21 | N | N | - | 8 | 17 | - | - | 1 |
| Calif. | 149 | 47 | 214 | - | 10 | 99 | 200 | 4 | 147 | 3 | 56 | 102 | 4 | 120 | 53 |
| Alaska | - | - | - | - | - | - | 9 | - | 4 | - | 1 | 9 | - | - | 1 |
| Hawaii | - | - | 19 | - | 1 | 13 | 1 | - | 9 | - | 3 | 3 | - | 2 | 28 |
| Guam | 1 | - | 3 | - | - | 10 | - | - | 3 | - | - | - | - | 2 | 1 |
| P.R. | 3 | - | 18 | - | - | 46 | 2 | 4 | 20 | 1 | 6 | 3 | - | 58 | 19 |
| V.I. | - | U | - | U | - | 10 | - | U | 9 | U | - | - | U | - | - |
| Pac. Trust Terr. | - | - | - | - | - | - | 1 | - | 3 | - | - | - | - | - | - |
| Amer. Samoa | - | 1 | 2 | - | - | - | - | - | - | - | - | - | - | - | - |

*For measles only, imported cases includes both out-of-state and international importations.

N: Not notifiable U: Unavailable †International §Out-of-state

**TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending June 7, 1986 and June 8, 1985 (23rd Week)**

| Reporting Area | Syphilis (Civilian) (Primary & Secondary) | | Toxic-shock Syndrome | Tuberculosis | | Tula-remia | Typhoid Fever | Typhus Fever (Tick-borne) (RMSF) | Rabies, Animal |
|---|---|---|---|---|---|---|---|---|---|
| | Cum. 1986 | Cum. 1985 | 1986 | Cum. 1986 | Cum. 1985 | Cum. 1986 | Cum. 1986 | Cum. 1986 | Cum. 1986 |
| UNITED STATES | 11,036 | 10,900 | 1 | 8,980 | 8,780 | 30 | 107 | 144 +33 | 2,382 |
| NEW ENGLAND | 223 | 241 | - | 291 | 296 | - | 4 | 1 | 3 |
| Maine | 15 | 7 | - | 26 | 20 | - | - | - | - |
| N.H. | 7 | 5 | - | 7 | 11 | - | - | - | - |
| Vt. | 6 | 1 | - | 10 | 4 | - | - | - | - |
| Mass. | 113 | 123 | - | 138 | 184 | - | 3 | 1 | - |
| R.I. | 13 | 7 | - | 19 | 21 | - | - | - | 1 |
| Conn. | 69 | 98 | - | 91 | 56 | - | 1 | - | 2 |
| MID ATLANTIC | 1,637 | 1,498 | - | 1,778 | 1,619 | - | 11 | 1 | 183 |
| Upstate N.Y. | 79 | 109 | - | 265 | 266 | - | 1 | 1 | 30 |
| N.Y. City | 889 | 920 | - | 855 | 814 | - | 5 | - | 1 |
| N.J. | 298 | 317 | - | 341 | 192 | - | 4 | - | 6 |
| Pa. | 371 | 152 | - | 317 | 347 | - | 1 | - | 146 |
| E.N. CENTRAL | 467 | 517 | - | 1,113 | 1,081 | - | 8 | 25 +4 | 53 |
| Ohio | 60 | 64 | - | 185 | 196 | - | 1 | 25 4 | 5 |
| Ind. | 52 | 50 | - | 121 | 134 | - | - | - | 9 |
| Ill. | 255 | 267 | - | 491 | 479 | - | 1 | - | 15 |
| Mich. | 73 | 110 | - | 263 | 214 | - | 5 | - | 9 |
| Wis. | 27 | 26 | - | 53 | 58 | - | 1 | - | 15 |
| W.N. CENTRAL | 112 | 111 | 1 | 255 | 228 | 8 | 5 | 9 +4 | 385 |
| Minn. | 18 | 26 | - | 61 | 40 | - | 1 | 1 | 43 |
| Iowa | 6 | 14 | - | 22 | 33 | 1 | - | - | 81 |
| Mo. | 59 | 48 | - | 130 | 108 | 7 | 4 | 4 3 | 41 |
| N. Dak. | 2 | 1 | - | 4 | 2 | - | - | - | 95 |
| S. Dak. | 1 | 4 | - | 10 | 13 | - | - | - | 89 |
| Nebr. | 11 | 6 | 1 | 5 | 9 | - | - | 1 1 | 5 |
| Kans. | 15 | 12 | - | 23 | 23 | - | - | 3 | 31 |
| S. ATLANTIC | 3,052 | 2,714 | - | 1,744 | 1,796 | 4 | 14 | 53 +18 | 556 |
| Del. | 20 | 17 | - | 19 | 17 | - | - | - | - |
| Md. | 196 | 183 | - | 131 | 163 | 1 | 4 | 5 | 306 |
| D.C. | 148 | 161 | - | 56 | 78 | - | 1 | - | - |
| Va. | 188 | 136 | - | 159 | 145 | 1 | 3 | 7 | 87 |
| W. Va. | 8 | 4 | - | 50 | 46 | - | 2 | 4 | 13 |
| N.C. | 213 | 294 | - | 234 | 224 | 1 | 2 | 16 8 | 3 |
| S.C. | 297 | 347 | - | 200 | 208 | - | - | 18 9 | 18 |
| Ga. | 383 | - | - | 261 | 296 | 1 | - | 3 1 | 72 |
| Fla. | 1,599 | 1,572 | - | 634 | 619 | - | 2 | - | 57 |
| E.S. CENTRAL | 748 | 930 | - | 798 | 802 | 3 | 1 | 20 +5 | 139 |
| Ky. | 33 | 33 | - | 198 | 171 | 2 | - | 5 4 | 44 |
| Tenn. | 278 | 265 | - | 227 | 248 | 1 | - | 6 | 56 |
| Ala. | 246 | 297 | - | 263 | 257 | - | - | 2 | 39 |
| Miss. | 191 | 335 | - | 110 | 126 | - | 1 | 7 1 | - |
| W.S. CENTRAL | 2,339 | 2,729 | - | 1,069 | 911 | 12 | 6 | 30 +2 | 382 |
| Ark. | 109 | 132 | - | 133 | 101 | 8 | - | 1 | 89 |
| La. | 386 | 468 | - | 186 | 147 | 1 | - | - | 10 |
| Okla. | 65 | 82 | - | 103 | 120 | 3 | 1 | 24 2 | 32 |
| Tex. | 1,779 | 2,047 | - | 647 | 543 | - | 5 | 5 | 251 |
| MOUNTAIN | 270 | 340 | - | 205 | 216 | 2 | 7 | 5 | 383 |
| Mont. | 3 | 2 | - | 10 | 29 | - | 1 | 2 | 136 |
| Idaho | 5 | 3 | - | 5 | 11 | - | - | - | - |
| Wyo. | - | 5 | - | - | 5 | - | - | 1 | 181 |
| Colo. | 78 | 83 | - | 10 | 29 | - | 1 | 2 | - |
| N. Mex. | 33 | 45 | - | 45 | 41 | 1 | - | - | 3 |
| Ariz. | 116 | 181 | - | 99 | 89 | - | 2 | - | 63 |
| Utah | 4 | 3 | - | 21 | 6 | 1 | 2 | - | - |
| Nev. | 31 | 18 | - | 15 | 6 | - | 1 | - | - |
| PACIFIC | 2,188 | 1,820 | - | 1,727 | 1,781 | 1 | 51 | - | 298 |
| Wash. | 48 | 59 | - | 91 | 98 | - | 2 | - | - |
| Oreg. | 46 | 41 | - | 60 | 66 | - | - | - | - |
| Calif. | 2,075 | 1,682 | - | 1,440 | 1,482 | - | 45 | - | 290 |
| Alaska | - | 1 | - | 27 | 56 | 1 | 1 | - | 8 |
| Hawaii | 19 | 37 | - | 109 | 79 | - | 3 | - | - |
| Guam | 1 | 2 | - | 30 | 20 | - | - | - | - |
| P.R. | 347 | 373 | - | 127 | 143 | - | 3 | - | 19 |
| V.I. | - | 1 | U | 1 | 1 | - | - | - | - |
| Pac. Trust Terr. | 112 | 40 | - | 21 | 29 | - | 27 | - | - |
| Amer. Samoa | - | - | - | 3 | - | - | - | - | - |

U: Unavailable

## TABLE IV. Deaths in 121 U.S. cities,* week ending June 7, 1986 (23rd Week)

| Reporting Area | All Causes, By Age (Years) | | | | | | P&I** Total |
|---|---|---|---|---|---|---|---|
| | All Ages | ≥65 | 45-64 | 25-44 | 1-24 | <1 | |
| NEW ENGLAND | 681 | 472 | 133 | 46 | 10 | 20 | 57 |
| Boston, Mass. | 161 | 104 | 25 | 22 | 2 | 8 | 25 |
| Bridgeport, Conn. | 55 | 41 | 12 | 2 | - | - | 4 |
| Cambridge, Mass. | 29 | 22 | 5 | 1 | 1 | - | 3 |
| Fall River, Mass. | 34 | 28 | 4 | 1 | - | 1 | 2 |
| Hartford, Conn. | 66 | 38 | 21 | 5 | 1 | 1 | 4 |
| Lowell, Mass. | 26 | 19 | 7 | - | - | - | 1 |
| Lynn, Mass. | 15 | 13 | 2 | - | - | - | - |
| New Bedford, Mass. | 24 | 19 | 3 | 2 | - | - | 1 |
| New Haven, Conn. | 49 | 29 | 14 | 3 | 1 | 2 | 4 |
| Providence, R.I. | 70 | 46 | 18 | 4 | - | 2 | 3 |
| Somerville, Mass. | 7 | 6 | 1 | - | - | - | 1 |
| Springfield, Mass. | 41 | 32 | 4 | 1 | 2 | 2 | 4 |
| Waterbury, Conn. | 35 | 29 | 2 | 1 | 1 | 2 | 1 |
| Worcester, Mass. | 69 | 46 | 15 | 4 | 2 | 2 | 4 |
| MID ATLANTIC | 2,838 | 1,834 | 590 | 258 | 84 | 71 | 135 |
| Albany, N.Y. | 42 | 24 | 13 | 5 | - | - | - |
| Allentown, Pa. | 14 | 13 | - | 1 | - | - | - |
| Buffalo, N.Y. | 88 | 67 | 11 | 4 | 1 | 4 | 9 |
| Camden, N.J. | 37 | 20 | 12 | 2 | 1 | 2 | 1 |
| Elizabeth, N.J. | 34 | 25 | 7 | 1 | 1 | - | - |
| Erie, Pa.† | 42 | 31 | 6 | 3 | 2 | - | 5 |
| Jersey City, N.J. | 44 | 22 | 12 | 6 | 1 | 3 | 1 |
| N.Y. City, N.Y. | 1,428 | 915 | 278 | 157 | 42 | 36 | 58 |
| Newark, N.J. | 92 | 40 | 23 | 14 | 5 | 10 | 3 |
| Paterson, N.J. | 38 | 24 | 8 | 4 | 2 | - | 4 |
| Philadelphia, Pa. | 495 | 324 | 113 | 32 | 16 | 10 | 25 |
| Pittsburgh, Pa.† | 62 | 43 | 11 | 4 | 3 | 1 | - |
| Reading, Pa. | 33 | 18 | 12 | 2 | 1 | - | 3 |
| Rochester, N.Y. | 126 | 94 | 18 | 12 | 2 | - | 12 |
| Schenectady, N.Y. | 28 | 18 | 6 | 3 | 1 | - | 1 |
| Scranton, Pa.† | 27 | 20 | 6 | 1 | - | - | 1 |
| Syracuse, N.Y. | 86 | 49 | 25 | 5 | 5 | 2 | 7 |
| Trenton, N.J. | 44 | 31 | 9 | 1 | 1 | 2 | 1 |
| Utica, N.Y. | 29 | 22 | 7 | - | - | - | 4 |
| Yonkers, N.Y. | 49 | 34 | 13 | 1 | - | 1 | - |
| E.N. CENTRAL | 2,365 | 1,514 | 507 | 191 | 64 | 89 | 80 |
| Akron, Ohio | 38 | 29 | 7 | 2 | - | - | - |
| Canton, Ohio | 32 | 20 | 8 | 2 | - | 2 | 4 |
| Chicago, Ill.§ | 564 | 362 | 125 | 45 | 10 | 22 | 16 |
| Cincinnati, Ohio | 143 | 99 | 30 | 4 | 4 | 6 | 10 |
| Cleveland, Ohio | 166 | 95 | 46 | 19 | 4 | 2 | 4 |
| Columbus, Ohio | 133 | 70 | 34 | 16 | 6 | 7 | - |
| Dayton, Ohio | 136 | 78 | 34 | 13 | 6 | 5 | 3 |
| Detroit, Mich. | 299 | 182 | 60 | 36 | 9 | 12 | 6 |
| Evansville, Ind. | 38 | 30 | 3 | 2 | 2 | 1 | - |
| Fort Wayne, Ind. | 46 | 32 | 9 | 3 | 2 | - | 2 |
| Gary, Ind. | 17 | 11 | 3 | 1 | 1 | 1 | 2 |
| Grand Rapids, Mich. | 47 | 36 | 6 | 2 | 2 | 1 | 7 |
| Indianapolis, Ind. | 197 | 117 | 43 | 15 | 8 | 14 | 1 |
| Madison, Wis. § | 39 | 29 | 5 | 2 | - | 3 | 3 |
| Milwaukee, Wis. | 146 | 92 | 35 | 13 | 2 | 4 | 5 |
| Peoria, Ill. | 57 | 40 | 10 | 2 | 3 | 2 | 7 |
| Rockford, Ill. | 49 | 38 | 4 | 5 | - | 2 | 1 |
| South Bend, Ind. | 37 | 27 | 6 | 2 | 2 | - | 4 |
| Toledo, Ohio | 116 | 82 | 22 | 5 | 3 | 4 | 2 |
| Youngstown, Ohio | 65 | 45 | 17 | 2 | - | 1 | 3 |
| W.N. CENTRAL | 750 | 513 | 148 | 43 | 24 | 21 | 30 |
| Des Moines, Iowa | 50 | 33 | 10 | 3 | 1 | 2 | 1 |
| Duluth, Minn. | 34 | 26 | 6 | 2 | - | - | 3 |
| Kansas City, Kans. | 39 | 23 | 6 | 6 | 2 | 2 | 2 |
| Kansas City, Mo. | 110 | 77 | 22 | 7 | 3 | 1 | 5 |
| Lincoln, Nebr. | 33 | 25 | 6 | - | 2 | - | 4 |
| Minneapolis, Minn. | 97 | 58 | 22 | 11 | 3 | 3 | 4 |
| Omaha, Nebr. | 94 | 61 | 24 | 5 | 4 | - | - |
| St. Louis, Mo. | 145 | 104 | 23 | 5 | 6 | 7 | 4 |
| St. Paul, Minn. | 58 | 42 | 12 | 1 | 1 | 2 | 2 |
| Wichita, Kans. | 90 | 64 | 17 | 3 | 2 | 4 | 5 |
| S. ATLANTIC | 1,234 | 748 | 285 | 108 | 47 | 45 | 64 |
| Atlanta, Ga. | 156 | 84 | 43 | 16 | 9 | 4 | 4 |
| Baltimore, Md. | 177 | 119 | 34 | 9 | 7 | 8 | 6 |
| Charlotte, N.C. | 78 | 48 | 18 | 6 | 3 | 3 | 6 |
| Jacksonville, Fla. | 108 | 80 | 19 | 1 | 3 | 5 | 5 |
| Miami, Fla. | 92 | 39 | 26 | 14 | 6 | 7 | 3 |
| Norfolk, Va. | 68 | 39 | 14 | 8 | 3 | 4 | 7 |
| Richmond, Va. | 92 | 56 | 24 | 4 | 4 | 4 | 11 |
| Savannah, Ga. | 39 | 22 | 13 | 3 | 1 | - | 6 |
| St. Petersburg, Fla. | 117 | 96 | 15 | 3 | 1 | 2 | 10 |
| Tampa, Fla. | 76 | 43 | 22 | 5 | 3 | 2 | - |
| Washington, D.C. | 197 | 100 | 51 | 35 | 7 | 4 | 5 |
| Wilmington, Del. | 34 | 22 | 6 | 4 | - | 2 | 1 |
| E.S. CENTRAL | 769 | 505 | 171 | 54 | 23 | 16 | 38 |
| Birmingham, Ala. | 130 | 89 | 28 | 12 | - | 1 | 2 |
| Chattanooga, Tenn. | 58 | 37 | 13 | 6 | 1 | 1 | 9 |
| Knoxville, Tenn. § | 87 | 60 | 19 | 5 | 3 | - | 5 |
| Louisville, Ky. | 106 | 71 | 25 | 5 | 3 | 2 | 6 |
| Memphis, Tenn. | 164 | 108 | 35 | 11 | 7 | 3 | 9 |
| Mobile, Ala. | 73 | 48 | 11 | 6 | 3 | 5 | 1 |
| Montgomery, Ala. | 42 | 29 | 11 | 1 | - | 1 | 2 |
| Nashville, Tenn. | 109 | 63 | 29 | 8 | 6 | 3 | 4 |
| W.S. CENTRAL | 1,350 | 797 | 313 | 138 | 56 | 45 | 51 |
| Austin, Tex. | 62 | 40 | 13 | 5 | 3 | 1 | 3 |
| Baton Rouge, La. | 69 | 42 | 16 | 8 | 3 | - | - |
| Corpus Christi, Tex.§ | 42 | 28 | 10 | 3 | 1 | - | 1 |
| Dallas, Tex. | 225 | 125 | 44 | 32 | 8 | 16 | 7 |
| El Paso, Tex. | 59 | 35 | 10 | 5 | 3 | 6 | 1 |
| Fort Worth, Tex. | 122 | 67 | 28 | 18 | 6 | 3 | 11 |
| Houston, Tex | 242 | 138 | 73 | 19 | 8 | 4 | 5 |
| Little Rock, Ark. | 79 | 51 | 18 | 5 | 4 | 1 | 7 |
| New Orleans, La. | 146 | 88 | 33 | 15 | 7 | 3 | 2 |
| San Antonio, Tex. | 139 | 72 | 37 | 17 | 9 | 4 | 9 |
| Shreveport, La. | 65 | 42 | 14 | 3 | - | 6 | - |
| Tulsa, Okla. | 100 | 69 | 17 | 8 | 4 | 1 | 5 |
| MOUNTAIN | 748 | 458 | 144 | 61 | 42 | 43 | 29 |
| Albuquerque, N.Mex. | 104 | 64 | 21 | 6 | 11 | 2 | 6 |
| Colo. Springs, Colo. | 32 | 23 | 9 | - | - | - | 5 |
| Denver, Colo. | 139 | 70 | 32 | 12 | 7 | 18 | 5 |
| Las Vegas, Nev. | 103 | 65 | 24 | 5 | 6 | 3 | 3 |
| Ogden, Utah | 27 | 20 | 2 | 3 | 1 | 1 | 1 |
| Phoenix, Ariz. | 163 | 94 | 34 | 22 | 7 | 6 | - |
| Pueblo, Colo. | 32 | 24 | 6 | 1 | - | 1 | 1 |
| Salt Lake City, Utah | 44 | 21 | 8 | 3 | 3 | 9 | - |
| Tucson, Ariz. | 104 | 77 | 8 | 9 | 7 | 3 | 8 |
| PACIFIC | 2,014 | 1,302 | 431 | 157 | 78 | 35 | 125 |
| Berkeley, Calif. | 14 | 12 | 1 | 1 | - | - | - |
| Fresno, Calif. | 78 | 53 | 15 | 3 | 5 | 2 | 8 |
| Glendale, Calif. | 20 | 16 | 3 | 1 | - | - | - |
| Honolulu, Hawaii | 55 | 39 | 12 | 3 | 1 | - | 4 |
| Long Beach, Calif. | 89 | 49 | 28 | 6 | 2 | 4 | 12 |
| Los Angeles, Calif. | 659 | 416 | 127 | 71 | 31 | 6 | 21 |
| Oakland, Calif. | 62 | 40 | 15 | 3 | - | 4 | 4 |
| Pasadena, Calif. § | 32 | 24 | 6 | 1 | - | 1 | 2 |
| Portland, Oreg. | 128 | 89 | 21 | 9 | 6 | 3 | 7 |
| Sacramento, Calif. | 137 | 86 | 33 | 11 | 4 | 3 | 13 |
| San Diego, Calif. | 140 | 86 | 33 | 10 | 6 | 4 | 16 |
| San Francisco, Calif. | 144 | 90 | 34 | 15 | 4 | 1 | 6 |
| San Jose, Calif. | 159 | 102 | 38 | 11 | 5 | 2 | 15 |
| Seattle, Wash. | 169 | 116 | 35 | 8 | 9 | 1 | 7 |
| Spokane, Wash. | 77 | 48 | 20 | 2 | 4 | 2 | 7 |
| Tacoma, Wash. | 51 | 36 | 10 | 2 | 1 | 2 | 3 |
| TOTAL | 12,749†† | 8,143 | 2,722 | 1,056 | 428 | 385 | 609 |

* Mortality data in this table are voluntarily reported from 121 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

** Pneumonia and influenza.

† Because of changes in reporting methods in these 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

†† Total includes unknown ages.

§ Data not available. Figures are estimates based on average of past 4 weeks.

*HTLV-III/LAV – Continued*

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## *Epidemiologic Notes and Reports*

# Gastroenteritis Outbreaks on Two Caribbean Cruise Ships

Three outbreaks of gastroenteritis occurred on two Caribbean cruise ships between April 26, and May 10, 1986. More than 1,200 persons developed gastrointestinal illness; no deaths were reported. At least one of the outbreaks appears to be associated with Norwalk virus.

Two outbreaks occurred on two consecutive 1-week cruises of the *Holiday*, a Carnival Cruise Line ship. Between April 26 and May 3, a total of 392 (25%) of 1,550 passengers and 30 (4%) of 679 crew who completed questionnaires developed gastroenteritis. Eighty-six percent had diarrhea; 62%, vomiting; 36%, headache; and 26%, subjective symptoms of fever. The outbreak peaked on the fifth and sixth days of the cruise. On the next voyage, from May 3 to May 10, a second outbreak occurred on the *Holiday* in which 321 (22%) of 1,470 passengers and 48 (7%) of 658 crew developed gastroenteritis. A sanitation inspection initiated by CDC on May 3 revealed deficiencies related to water chlorination record-keeping, food preparation and holding, and potential contamination of food. A detailed account of these deficiencies was provided to the ship's management at the end of the investigation on May 3, and recommendations were made to prohibit food-service personnel from working while ill and to correct the sanitation deficiencies. A week later, when the inspection was completed, several deficiencies similar to those of the previous week were noted. The final vessel sanitation inspection score on May 10 was 18 out of a possible 100 points (passing = 85).

An outbreak of gastroenteritis also occurred on Holland America Cruises' *Rotterdam*. Between May 3 and May 10, 405 (37%) of 1,108 passengers and 35 (6%) of 554 crew who completed questionnaires had a gastrointestinal illness. Eighty percent of ill passengers had diarrhea; 78%, vomiting; 41%, headache; and 32%, subjective symptoms of fever. Mean duration of illness was 2.4 days, and 76% of ill passengers were confined to their cabins during the illness. A sanitation inspection by CDC on May 9 and May 10 revealed numerous deficiencies

*Gastroenteritis — Continued*

related to food and water sanitation; the sanitation inspection score was 16 out of a possible 100 points. A detailed account of the deficiencies was presented to the ship's management on May 10 following the inspection, and recommendations were made to prohibit food service personnel from working while ill and to correct the sanitation deficiencies.

Bacterial cultures of stool specimens from the first *Holiday* outbreak did not yield any recognized pathogens. However, an eightfold or greater rise in antibodies to Norwalk virus was demonstrated by biotin-avidin immunoassay (*1*) in paired sera obtained from three ill *Holiday* crew members who had suffered gastroenteritis during the April 26-May 3 voyage; Norwalk antigen was detected by biotin-avidin immunoassay in two of six ill passengers from the same voyage. Laboratory studies of specimens and epidemiologic analysis of questionnaires from ill passengers and crew from all three outbreaks are continuing.

*Reported by Div of Quarantine, Center for Prevention Svcs, Enteric Diseases Br, Div of Bacterial Diseases, Respiratory and Enterovirus Br, Div of Viral Diseases, Center for Infectious Diseases, CDC.*

**Editorial Note:** Outbreaks of gastrointestinal illness on cruise vessels have been caused in the past by contaminated water and by food consumed on the ships or on shore visits (*2*). Person-to-person transmission has also been strongly suspected on some occasions—in one case, in the setting of repeated outbreaks on consecutive cruises (*3*).

Laboratory findings implicated Norwalk virus as the pathogenic agent on the first of the *Holiday* outbreaks. However, all three outbreaks had epidemiologic features characteristic of epidemics of Norwalk virus gastroenteritis. These include: (1) a high attack rate in adults; (2) a high frequency of vomiting; (3) short duration of illness; and (4) absence of identified bacterial pathogens (*4*).

It is not yet clear whether food or water were vehicles of infection in these outbreaks or whether sanitary deficiencies contributed to the risk of outbreaks of viral enteric disease on these cruise ships.

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## *International Notes*

# Rapid Nutritional Status Evaluation During Drought Conditions — Republic of Niger

During the 1984 summer growing season, Niger experienced a severe drought. National food production was estimated to be 44% of that in 1983 (*1*). In response to the drought, the Government of Niger (GON) and the U.S. Agency for International Development (USAID) invited CDC to participate in a nutritional status assessment. Using previously developed CDC nutrition survey methodology, survey sites were chosen randomly in each of the seven departments of Niger. Between December 1984 and February 1985, 3,264 children between 65

*Nutritional Status Evaluation — Continued*

and 110 cm tall (approximately 6-59 months of age) were surveyed. A standardized questionnaire was used to record height, weight, arm circumference, measles vaccination status, recent illness, clinical evidence of vitamin A and C deficiencies, and food aid status for each child.

Few children in any of the departments were less than 70% of median weight-for-height (*2*) (Table 2). The overall prevalence of children less than 80% of median weight-for-height ranged from 9.8% in Diffa to 13.7% in Maradi. Rates of children with possible borderline nutritional status (80%-85% of median weight-for-height) were higher (12.9% in Zinder to 19.0% in Agadez) than expected rates in the United States (3%-7%), depending on age. Measles vaccination levels ranged from 32.8% in Tahoua to 56.2% in Maradi. Reported diarrhea rates in the 2 weeks before the survey ranged from 16.4% in Niamey to 40.3% in Agadez. Eye signs suggestive of vitamin A deficiency were found in 2.1% of the children in one department and in smaller numbers in three other departments. Widely varying percentages of families reported receiving food aid in the past year.

While the small sample size limits the conclusions that can be drawn from disaggregated data, nutritional status appeared to vary by type of settlement. Groups of displaced women and children who had spontaneously gathered in urban centers and who were not receiving organized nutritional support were more severely affected than families who remained in their rural villages and families who had been relocated to off-season garden sites* where food aid was being distributed.

*Sites where families are relocated during the dry season to cultivate small vegetable gardens.

**TABLE 2. Nutrition status and other health indicators of children 6-59 months of age — Niger, 1984-1985**

| | Department | | | | | | |
|---|---|---|---|---|---|---|---|
| **Characteristic** | **Agadez** | **Diffa** | **Dosso** | **Maradi** | **Niamey** | **Tahoua** | **Zinder** |
| Sample size | 457 | 443 | 424 | 477 | 483 | 470 | 510 |
| Percent of median weight-for-height | | | | | | | |
| < 70% | 1.8% | 0.5% | 2.1% | 1.1% | 0.6% | 1.1% | 1.8% |
| 70-79% | 11.4% | 9.3% | 8.0% | 12.6% | 11.2% | 10.4% | 10.4% |
| 80-84% | 19.0% | 18.7% | 14.4% | 15.7% | 14.9% | 14.3% | 12.9% |
| Total < 80% | 13.2% | 9.8% | 10.1% | 13.7% | 11.8% | 11.5% | 12.2% |
| Total < 85% | 32.2% | 28.5% | 24.5% | 29.4% | 26.7% | 25.8% | 25.1% |
| Diarrhea in past 2 weeks | 40.3% | 24.4% | 32.3% | 19.5% | 16.4% | 32.8% | 38.0% |
| Vaccinated against measles | 53.0% | 42.2% | 46.2% | 56.2% | 46.4% | 32.8% | 43.1% |
| Received food aid in past year | 66.1% | 62.3% | 25.5% | 40.9% | 53.2% | 17.5% | 17.7% |

*Nutritional Status Evaluation — Continued*

Recommendations to the GON emphasized identification and emergency support of displaced women and children, as well as implementation of basic nutrition and health activities at the off-season garden sites and in the rural villages. Because of the logistic difficulties with continuing weight-for-height measurements on a population basis, nutritional status surveillance by arm circumference measurement was recommended.

*Reported by the Government of the Republic of Niger; US Agency for International Development, Niger, Office of Foreign Disaster Assistance, US Agency for International Development, Washington DC; Div of Nutrition, Center for Health Promotion and Education, International Health Program Office, CDC.*

**Editorial Note:** During the past decade, CDC epidemiologists have participated in a number of rapid nutrition evaluations in sub-Saharan Africa. These surveys provide population-based data that can be used in decision-making during emergent situations.

Because of the long lead time necessary to arrange effective international food aid, it is particularly important for national governments and relief agencies to be able to estimate the population at risk before food supplies are exhausted. Such data collection is thus most useful for planning purposes if done shortly after poor harvests. The data collected in these and similar surveys can be used to estimate both the number of currently undernourished children and the number of those children whose weight-for-height status (i.e., 80%-85% of median) suggests that they are at greatest risk of becoming acutely undernourished as the local food supplies are exhausted before the next harvest. These latter children, although not yet acutely undernourished, are also logical candidates for inclusion in supplementary feeding programs.

The widely varying rates of recent diarrhea (range 16.4%-40.3%) may in part be explained by the survey design; such characteristics tend to cluster by geographic area. However, prolonged or recurrent diarrhea may be responsible for precipitating severe undernutrition among children already in marginal nutritional status (*3*).

Rates of clinical signs of vitamin A deficiency in one province exceeded the criteria suggested by the World Health Organization as indicating the need for large-scale distribution of vitamin A capsules (*4*). Lower rates in other departments may indicate that vitamin A deficiency is a less severe problem in these areas or may simply reflect sampling variability due to the unavoidably limited sample sizes, which are not specifically calculated to detect conditions as infrequent as clinical vitamin A deficiency. Thus, these lower rates must be interpreted with some caution. Because rapid nutritional status evaluations cannot be expected to provide reliable estimates of vitamin A, large-scale prophylaxis with 200,000 I.U. capsules (*3*) is probably warranted if relief foods are not known to contain sufficient quantities of vitamin A.

The proportion of families receiving food aid also varied considerably by cluster. Most food aid was received by families in off-season garden sites, while few families who lived in sedentary villages or who camped around urban areas had yet received aid. Plans were made to establish mechanisms for delivery of food aid to families not already settled in off-season garden sites, with highest priority to be given to families already displaced by famine.

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*Epidemiologic Notes and Reports*

## Salmonellosis Outbreaks Associated with Commercial Frozen Pasta — Massachusetts, New Jersey, New York

Outbreaks of *Salmonella* group D infections in New York, New Jersey, and Massachusetts have been associated with frozen pasta foods made by Rotanelli Foods, Inc. of New Rochelle, New York. *S. enteritidis* (group D) and *S. heidelberg* (group B) have been isolated from implicated products. These products are distributed to restaurants, caterers, institutions, and retail stores throughout the United States. A voluntary recall has begun. Questions about product distribution should be referred to the U.S. Food and Drug Administration District Offices. Associated outbreaks should be reported to the appropriate state health department and to Enteric Diseases Branch, Division of Bacterial Diseases, Center for Infectious Diseases, CDC.

*Reported by GF Grady, MD, State Epidemiologist, Massachusetts Dept of Public Health; WE Parkin, DVM, New Jersey State Dept of Health; DL Morse, MD, New York State Dept of Health; Div of Emergency and Epidemiological Operations, US Food and Drug Administration; Enteric Diseases Br, Div of Bacterial Diseases, Center for Infectious Diseases, CDC.*

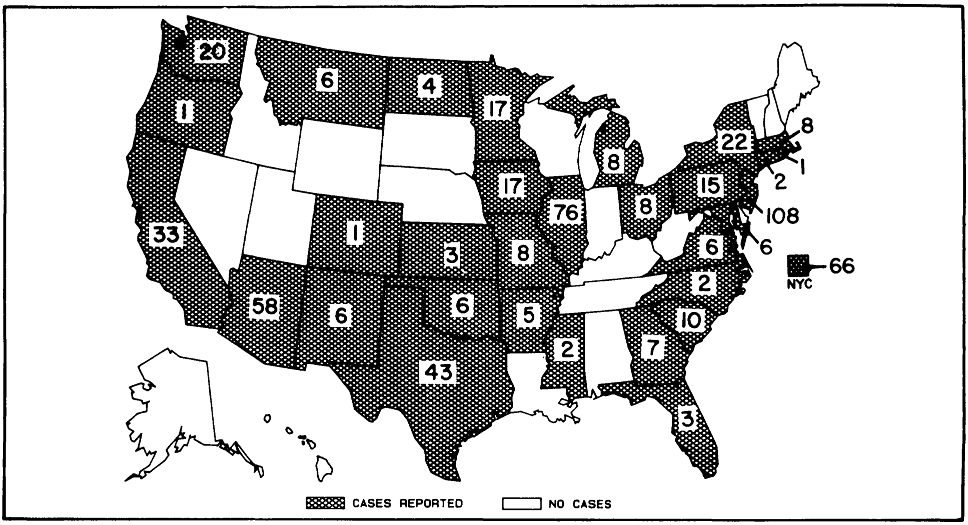
### Errata: Vol. 35, No. 22

**p. 366.** In the article, "Measles — United States, 1985," the first entry in Table 7 (page 369) under Causes of nonpreventability should be: Persons $<$ 16 mos. of age.

### Vol. 35, No. 21

**p. 341.** In the article, "Arboviral Infections of the Central Nervous System — United States, 1985," two corrections to Figure 2 (page 343) should be noted: (1) Colorado should be black; (2) the correct legend for the black-toned states is $\geq$0.1/100,000.

**FIGURE I. Reported measles cases — United States, weeks 19-22, 1986**

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The data in this report are provisional, based on weekly reports to CDC by state health departments. The reporting week concludes at close of business on Friday; compiled data on a national basis are officially released to the public on the succeeding Friday.

The editor welcomes accounts of interesting cases, outbreaks, environmental hazards, or other public health problems of current interest to health officials. Such reports and any other matters pertaining to editorial or other textual considerations should be addressed to: ATTN: Editor, *Morbidity and Mortality Weekly Report,* Centers for Disease Control, Atlanta, Georgia 30333.



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